

APPENDIX A
GENERAL SANTOS CITY
BUAYAN AIRPORT UPGRADING PROJECT

Economic Pre-Feasibility Study

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Executive Summary

Major upgrading and/or improvement of the Buayan Airport at General Santos City in Southern Mindanao Region, Philippines has been identified as one of the priority projects for the Mindanao Area Development program. The purpose of the proposed upgrading/improvement of this Airport is to accommodate or serve larger aircrafts or jet planes for passenger and heavy air cargo service for the future agricultural and industrial development of General Santos City and surrounding areas of the South Cotabato Province, Mindanao, Philippines as planned by the Government of the Philippines.

Four alternative alternative schemes have been identified for the improvement of the air transport system in the area, namely: Scheme 1 - At an approximate costs of P268.3M (\$12.2M) upgrade the existing Buayan Airport with all the necessary facilities to support B-737 and BAC -111 passenger and cargo jets and C-130 cargo planes; Scheme 2 - Upgrade the existing airport facilities same as Scheme 1 and develop a new temporary air strip, 1,300 m. x 30 m. with asphalt pavement at Barangay Apopong with a temporary terminal building to provide temporary service while Buayan Airport facilities are being constructed; this scheme is estimated to cost approximately P380.8M (\$17.8M); Scheme 3 - Suspend the upgrading of the existing Buayan Airport which can be eventually assigned to general or military aviation and develop a brand new semi-international airport at Barangay Apopong with the same standards as Davao or Zamboanga Airport. This scheme is estimated to cost approximately P800.0M (\$37.0M); and Scheme 4 - This scheme would consist the construction of a new parallel to the existing runway of sufficient length and width to accommodate A-300, B-767 and C-130 cargo planes; the reclamation of a strip (120 m. x 40 m.) at Sarangani Bay for extension of the runway to 2500 m. long and 40 m. wide. This scheme would require the purchase of additional real estate at the east side of the airport for the new parallel runway. The existing runway could continue to be used during construction of the new parallel runway and then converted to a taxiway. The standard for this scheme would be the same as the Davao Airport. This scheme is estimated to cost approximately P486.3M (\$22.2M).

This economic pre-feasibility study assumed that development scheme No. 4, which has been highly recommended by USAID consultant, would be implemented for the improvement of air transport services in General Santos City and surrounding areas of South Cotabato Province. It was assumed in the study that the implementation of necessary works and activities will be fully completed in five years or less, and the estimated total capital investment outlays of P486.3M would be invested in equal annual proportion during this five year implementation period. Once the Buayan Airport is fully upgraded (and provides similar services to that of Davao Airport), its O&M costs is assumed to be comparable to the O&M costs of Davao Airport.

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Buayan Airport Upgrading Project is expected to generate both "direct" and "indirect" benefits to various sectors (agricultural, industrial and commercial) not only in the project influence area but also to the entire economy. However, this economic pre-feasibility study was only focused to the evaluation of benefits that could be directly attributed to the project and can be easily translated or quantified in economic value. In spite of this narrowed analysis, the proposed project is evaluated to be economically feasible.

Based on the "partial accounting" of the anticipated benefits of the Airport Project, it is estimated that the intended capital investment of P436.3M would generate an economic internal rate of return of about 22.0 percent. The project's B/C Ratio at 15% discount factor, over a 35-year accounting period, is estimated to be 1.74 and the estimated total net present value (NPV) of the Airport Project is about P257.85M. If the other project benefits are assessed and included in the analysis, the economic internal rate of return, B/C Ratio and NPV for the project are expected to be significantly much higher than the above preliminary estimates. Finally, the sensitivity analysis revealed that even though the project costs would increase by 20 percent along with a reduction of the project benefits by 20 percent, the proposed project is still economically viable.

The improvement of efficiency and cheaper express air transport services as a result of Buayan Airport Upgrading Project would certainly generate economic impacts in Gen. Santos City and surrounding areas of South Cotabato. The local population would be directly benefited by the project through the local expenditures of the project funds for labor, materials, food, rent, etc. The operators of commercial airline and cargo planes would benefit in terms of the potential reduction of transport services O&M costs inasmuch as the upgraded airport would be able to serve larger and more efficient jet planes. It is also expected that the transport cost of exported products as well as commuters will be reduced. The reduction in the transport costs will consequently induce increase production of perishable export products such as fish, vegetables, fruits and flowers. Furthermore, it is also expected that tourism industry and its related industries as well as local commerce would also benefit from the Buayan Airport Upgrading Project.

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GENERAL SANTOS CITY
BUAYAN AIRPORT UPGRADING PROJECT
Economic Pre-Feasibility Study

1.0. Introduction

Buayan Airport in General Santos City, South Cotabato, is one of the two airports in Southern Mindanao Region XI, Philippines. This airport serves the air-transport needs of General Santos City and its neighboring municipalities. The upgrading and/or improvement of Buayan Airport has been identified as a priority project under the USAID initiated Mindanao Area Development assistance program.

This present study is a pre-feasibility analysis of the proposed project for the upgrading and improvement of the Buayan Airport. It describes the present condition of the airport with reference to its existing facilities, operation and maintenance (O&M) expenditures, manpower organizational structure and its present performance in terms of air traffic movement. The proposed development schemes for this airport were reviewed and the future potentials once the airport is fully upgraded and operational is projected.

Because of time constraints, this study is based primarily on available secondary information which are quite inadequate to be able to undertake a more comprehensive analysis. Thus, the result of the analysis that were undertaken in this study is only an indicative of the economic feasibility of the airport project. Nevertheless, a framework for a more comprehensive study is developed and some policy implications were generated for future development efforts.

2.0. Present Condition of the Buayan Airport

The country's modal split of domestic traffic is presented in Table 1. In terms of passenger-km., air transport only share about 2.0 percent of the total passenger-km. domestic traffic. The total number of airports to support air transport in the country is only 86 which include international, trunkline, secondary and feeder airports (Table 2).

2.1. Geographical Location and Influence Area

Buayan Airport is located some 3.0 km. away from General Santos City; South Cotabato. It is geographically situated at 6°6'36" N latitude 125°14'4" E longitude (see Figure 1). Its topographic location averages 3.0 above mean sea level (m.s.l.), and borders Sarangani Bay. In terms of distance, the Buayan Airport is about 480 and 1,052 air km. distance to Cebu City and Manila, respectively (Table 3).

Access to this airport is via a well-paved (concrete and asphalt) road. It is served by all types of land transports, which includes public utility vehicles such as jeepneys, taxis and tricycles. No bus routes serve the airport, because it is not along the national highway.

Allah Valley Airport in North Cotabato, about 80.0 km. away, from Buayan, is an alternate aerodrome for Buayan Airport. However, Allah Valley Airport, just like Buayan Airport, is not served by commercial flights direct to Manila. Thus, air traffic (passenger and freight) destined for Manila usually transit through Davao City Airport. Key informants have suggested that the majority of the traffic from General Santos City destined for Manila usually take Davao City Airport as their port of departure.

2.2. Description of Existing Airport Infrastructure and Facilities

Buayan Airport is presently classified as Class B - a "trunkline airport" under the national classification standard. This airport serves General Santos City and its neighboring municipalities, one of the principal commercial centers of the country.

Some of the technical information describing the present facilities and infrastructure of Buayan Airport is presented in Table 4. The Airport has only one runway which is about 1690m. long and 30m. wide, with an asphalt pavement 4.0 inches thick; this may not be able to sustain heavy aircrafts. The runway has an average gradient of only 0.31 percent.

The runway does not have lighting that could guide aircraft to land during darkness or during the fog or heavy overcast.

Table 1. Approximated national modal split of domestic traffic, Philippines, 1980-1987.

=====					
Particular	1980		1987		Inc/Dec

Passenger:	Pass. km. (billion)	%	Pass. km. (billion)	%	Pass. km. (billion)

Road	53.00	90	83.00	89	30.00
Sea	4.00	7	8.00	9	4.00
Rail	0.40	1	0.22	-	(0.18)
Air	1.20	2	1.79	2	0.59
Freight:	Pass. km. (billion)	%	Pass. km. (billion)	%	Pass. km. (billion)

Road	22.00	65	22.00	53	0.00
Sea	12.00	35	19.00	47	7.00
Rail	0.04	-	0.02	-	(0.02)
Air	nil	-	0.03	-	0.03

Source: ADB Transport Policy. Regional Seminar. Vol. II.
The Philippine Transport System - Main Features.
ADB, Manila, Philippines. February, 1989.

Table 2. Number of national airports in the Philippines by category, as of June, 1990.

=====	
Category	Number

International	
- Regular *	2
- Alternate **	3
Trunkline	12
Secondary	37
Feeder	32

TOTAL	86
=====	

* Manila and Mactan

** Davao, Laoag and Zamboanga

Table 3. Air distance table for Airports in the Philippines (Direct airport to airport, kilometers).

Airport Location	TO / FROM	
	Manila	Cebu
Allah Valley	1,009	460
Antique	433	219
Aparri	438	937
Bacolod	483	111
Baguio	212	768
Borongan	NA	NA
Butuan	795	233
Cagayan	790	228
Calbayog	470	209
Catarman	454	257
Cauayan	280	772
Cotabato	895	356
Daet	214	441
Davao	969	406
Dipolog	711	204
Dumaguete	639	137
General Santos	1,052	480
Iligan	798	249
Iloilo	455	154
Ipil	779	327
Kalibo	348	227
Laoag	417	958
Legaspi	330	319
Malabang	845	304
Mamburao	151	488
Marinduque	156	409
Masbate	372	230
Mati	1,036	463
Naga	262	370
Ozamis	776	245
Pagadian	800	286
Puerto Princesa	586	571
Romblon	272	299
Roxas	385	183
San Fernando(L.U.)	246	806
San Jose (M)	240	389
Surigao	722	185
Tacloban	566	158
Tagbilaran	628	79
Tuguegarao	356	853
Virac	423	365
Zamboanga	859	431

Note: Manila-Cebu (Mactan) 563 km.

Source: Bureau of Air Transport and
Philippine Airlines.

Table 4. Technical Description of the Buayan Airport,
General Santos City, Philippines.

Particulars	Description
Location (Coordinates)	6° 6' 36" N 125° 14' 4" E
Elevation (a.s.l.)	3.0 m.
Temperature	33.6°C
NR/Type	01/19
Slope	0.31%
Aircraft/ Length	1,690 m.
Class	B (Trunkline)
Aircraft/ Strength (1000kg.)	AUW 13/1 17/2
Fuel/Octane	
Aids	
Stopway	01-60; 19-100
Clearway	01-280
Alternate Aerodromes	Davao/Francisco Bangoy Menado/Sam Ratulangi

Source: The Philippines: A Country Profile. USAID/OFDA
Washington, 1982. written by Evaluation
Technologies, Inc.

The absence of runway lighting, along with its pavement and its length restrict bigger aircraft from serving the area.

The airport's fences that are needed to prevent the entry of stray animals, etc. (which would obstruct incoming and outgoing aircraft) requires major improvement.

The airport terminal building and parking apron which include passenger arrival and departure areas and space for loading and unloading freight, plus office space for DOTC-ATO staff, is relatively small (only 50m. by 50m). A significant portion of the terminal building is rented to PAL, the sole commercial airline serving this airport.

At present, the airport does not have aircraft refueling facilities. Thus, the aircraft serving this airport must carry sufficient fuel which would enable them to reach a destination where they could be refueled.

The airport's air navigational facilities also require major improvement. At present, the air traffic controller uses only modular type (MD) communication equipment. Furthermore, radar, which could be used to guide incoming and outgoing aircraft, is yet to be planned for this airport.

At present, Buayan Airport is being upgraded under DOTC-ATO funding for 1990 in the amount of P20.00M. These improvements involve extending the runway by 140m (30m wide) P4.0M and the asphalt overlaying of existing 1500m by 30 m. runway in the amount of P16.0M.

2.3. Existing Management Organizational Structure of the Airport

The management and operation of commercial airports in the country is directly under the Air Transport Office (ATO) of the DOTC. Operation and maintenance of Buayan Airport is being undertaken by at least 35 personnel (including technical and non-technical staff and a crew of laborers). This work force excludes the ground crew of PAL.

Buayan Airport's management and organizational structure is presented in Figure 2. The overall management of airport operations airport is under the responsibility of the Airport Manager, supported by some 34 persons in five divisions, namely: administration, air navigation, security, firefighting and grounds/caretaker. There are 6 persons in the air navigation division, which means that with 8 hours shifts, only two persons man the air navigation facilities at any one time.

The employment status of airport personnel is not very satisfactory. Only one person is on permanent monthly employment status, two are on temporary monthly status, eleven are on casual

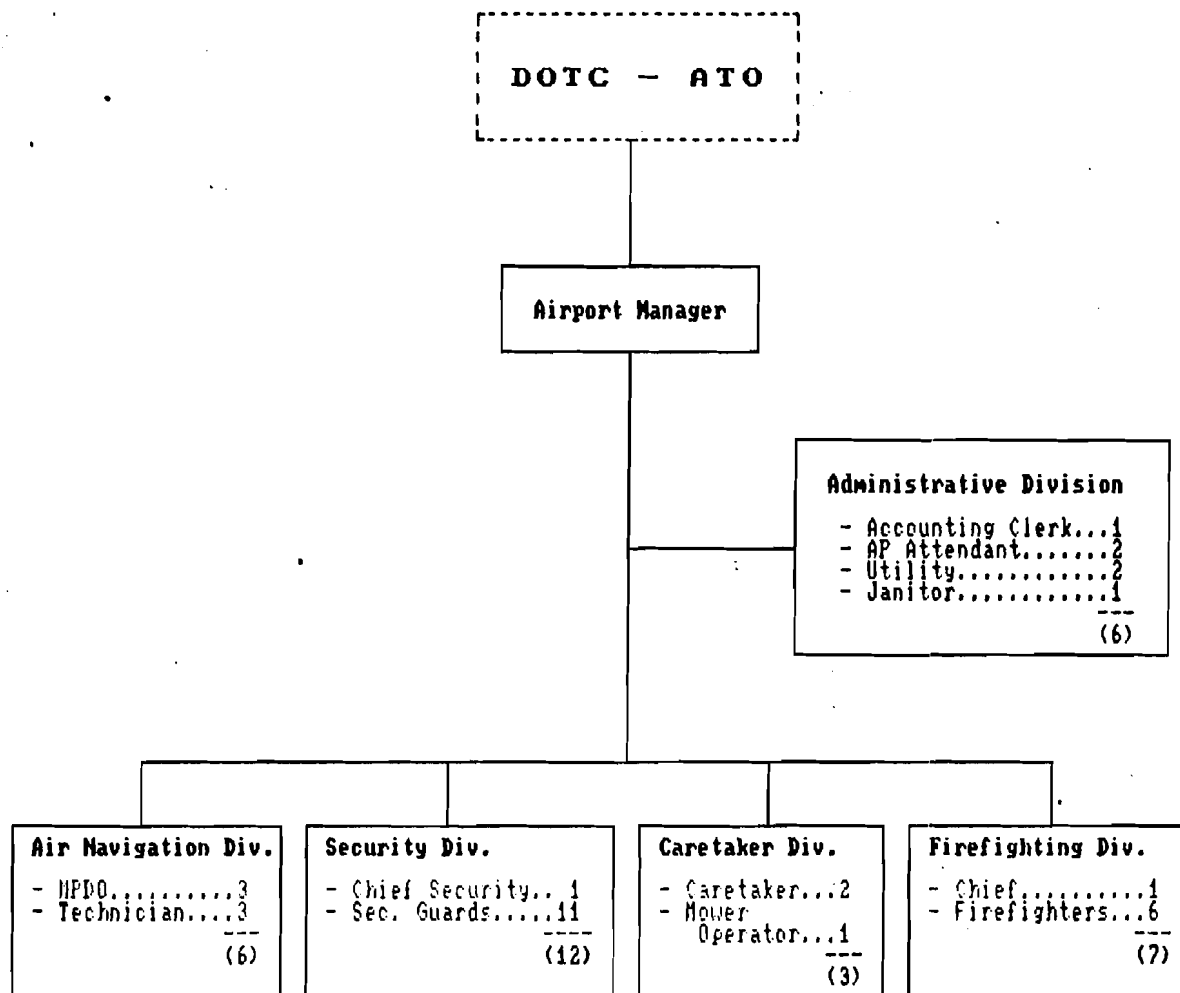


Figure . Buayan Airport Management Organizational Structure.

monthly status, and the rest (21) are on daily wage earner status. Generally, these insecure employment statuses are likely to have some implications on the efficiency of the operation of the airport. However, at least the persons that operates the air navigation control facilities (the most vital facility of an airport) have more or less semi-permanent (i.e. secured) employment status.

Based on an interview with the Airport Manager, it was learned that human resources development, e.g. the training of existing personnel for new airport operations and management, etc. and the addition of new highly trained personnel would be required if the Buayan Airport is to be upgraded to an "international airport" category.

2.4. Air Traffic Movement Profile

2.4.1. Number and Types of Aircraft Served

Information on the number and class of aircraft using (landing and take-off) at Buayan Airport during the past five years (1985 to 1989) is presented in Table 5. In addition to the commercial aircraft, general aviation and military aircraft also use this airport. During the last five years, the daily average number of aircraft landing and taking-off at the airport is three. In terms of the total annual average number of aircraft, commercial aircraft are the highest number served. These were followed by a general aviation's aircraft.

It is interesting to note that the total number of aircraft using this airport have increased by 11.99 percent. This significant increase is primarily contributed by the commercial airline, Philippine Airlines (PAL).

At present, PAL is the only commercial airline serving Buayan Airport. Because of limited airport facilities (e.g. short runway) only smaller aircraft (e.g. Fokker 50 or Sunriser) can serve the air transport needs of the area. PAL maintains a minimal average of two incoming and two outgoing daily flights to/from Mactan International Airport in Cebu City. At present, PAL does not have direct flights from the airport to Manila, and thus, commuters have to make flight connections at Cebu City.

2.4.2. Incoming and Outgoing Passengers

Basic statistics on the volume of air traffic movements at Buayan Airport from 1985 to 1989 are presented in Table 6. During this period the number of incoming and outgoing

passengers carried by commercial airlines have registered average annual growth rates of 14.78% and 14.64 %, respectively. The average annual number of outgoing passengers is comparatively larger than the number of incoming passengers.

Similarly, the trend in the total number of incoming and outgoing passengers carried by general aviation aircraft increased by average annual growth rates of 9.80% and 9.50%, respectively.

Table 5. Total Number of Aircraft Served (Landing and Take-Off) at the Buayan Airport, General Santos City, 1985-1989.

Year	Type of Aircraft			Total
	Commercial	General Aviation	Military	
1985	364	410	34	808
1986	455	592	33	1080
1987	529	582	39	1150
1988	537	460	82	1079
1989	692	511	27	1230
Daily Average	1.41	1.40	0.12	2.93
Annual Average	515.40	511.00	43.00	1069.40
Growth Rate (%)				
1985-86	25.00	44.39	-2.94	33.66
1986-87	16.26	-1.69	18.18	6.48
1987-88	1.51	-20.96	110.26	-6.17
1988-89	28.86	11.09	-67.07	13.99
Annual Average	17.91	8.21	14.61	11.99

Source: DOTC-ATO, Buayan Airport, General Santos City.

Table 6. Air Traffic Movement (Passengers and Freight) at Buayan Airport, General Santos City, 1985-1989.

Year	Commercial (PAL)			General Aviation			Military			Total		
	Incoming	Transit	Outgoing	Incoming	Transit	Outgoing	Incoming	Transit	Outgoing	Incoming	Transit	Outgoing
1. Passenger Traffic												
1985	14555	-	15914	759	184	640	181	44	117	15495	228	16671
1986	17033	-	17468	913	327	806	145	36	106	18091	363	18380
1987	17818	-	18924	1017	297	866	137	234	119	18972	531	19909
1988	17002	-	18406	636	376	603	683	388	891	18321	764	19900
1989	24154	-	26356	922	265	814	61	209	54	25137	474	27224
Average Volume	18112	-	19414	849	290	746	241	182	257	19203	472	20417
Growth Rate												
1985-86	17.03	-	9.76	20.29	77.72	25.94	-19.83	-18.18	-9.40	16.75	59.21	10.25
1986-87	4.61	-	8.34	11.39	-9.17	7.44	-5.52	550.00	12.26	4.87	46.28	8.32
1987-88	-4.58	-	-2.74	-37.46	26.60	-30.37	398.54	65.81	648.74	-3.43	43.88	-0.05
1988-89	42.07	-	43.19	44.97	-29.52	34.99	-91.07	-46.13	-93.94	37.20	-37.96	36.80
Annual Average	14.78	-	14.64	9.80	16.41	9.50	70.52	137.87	139.42	13.85	27.85	13.83
2. Freight/Cargo Traffic												
1985	85590	-	69734	5010	-	18900	-	-	-	90600	-	88634
1986	123480	-	108524	5369	-	128083	-	-	-	128849	-	236607
1987	136042	-	161967	13264	-	4605	-	-	-	149306	-	166572
1988	103732	-	247386	9007	-	61944	3335	-	34713	116074	-	344043
1989	244980	-	440721	24975	-	11741	14200	-	-	284155	-	452462
Average Volume	138765	-	205666	11525	-	45055	3507	-	6943	153797	-	257664
Growth Rate												
1985-86	44.27	-	55.63	7.17	-	577.69	-	-	-	42.22	-	166.95
1986-87	10.17	-	49.25	147.05	-	-96.40	-	-	-	15.88	-	-29.60
1987-88	-23.75	-	52.74	-32.09	-	1245.15	-	-	-	-22.26	-	106.54
1988-89	136.17	-	78.15	177.28	-	-81.05	325.79	-	-	144.81	-	31.51
Annual Average	41.71	-	58.94	74.85	-	411.35	81.45	-	-	45.16	-	68.85

Source: DOTC-ATO, Buayan Airport, General Santos City.

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2.4.3. Incoming and Outgoing Air Cargo/Freight

Freight, which is transported by air is generally considered as highly valued fragile and/or perishable. This is assumed based on the costs of air transport (relatively high) and its speed (which enables the delivery of freight in the shortest possible time).

The total volume of annual outgoing freight from Buayan Airport was noticeably greater than incoming freight. In other words there is a net export of freight from this airport, meaning that there is more volume of local produce exported from the project area than of other produce imported to the project area.

The average annual growth rate for outgoing freight is about 69.0%. This rate is expected to increase if the Airport is improved/upgraded. Hence, development will be (and is) needed as the local economy has developed and continue to develop. The production of perishable products, as well as others, are expected to increase given that they could be easily marketed with the improved capacity of the airport.

2.5. Airport O & M Costs and Revenue Collection

2.5.1. Estimated Annual O & M Costs

The estimated annual expenditures for the day-to-day operation and maintenance of the Airport is presented in Table 7. The total annual O & M cost is estimated to be about P1.07M. About 87 percent of this amount covers the costs of personnel, including regular salaries and wages plus COLA and incentive pay for night and overtime services.

The estimated annual costs of repair and maintenance for the operation of the airport is P140,000, which is only 13 percent of the total airport annual O & M costs. Fuel and oil is a major element of the repair and maintenance costs. If one evaluates the actual amount for repair and maintenance, it would not be surprising to find that most of the airport facilities are not properly maintained.

Table 7. Estimated Annual Operation and Maintenance
(O&M) Costs of Buayan Airport, General
Santos City, as of August, 1990.

Particular	Estimated Costs	
	(Pesos)	(%)
1. Personal Services		
- Salaries and COLA	467,412	43.83
- Wages and COLA	384,768	36.08
- Tech. Inccentive Allowance	64,800	6.08
- Night and Overtime Diff.	9,600	0.80
Sub-total	926,580	86.88
2. Repair and Maintenance		
- Travelling expenses	15,500	1.45
- Comm. services		
- Repair of Facilities		
Equipment & Vehicles	4,000	0.38
- Fuel and oil	49,000	4.59
- Spare parts	13,400	1.26
- Office supplies & Materials	18,400	1.73
- Water and power	37,000	3.47
- Misc. expenses of		
Mgr./OIC	2,600	0.24
Sub-total	139,900	13.12
TOTAL	1,066,480	100.00

Source: DOTC-ATO, General Santos City.

2.5.2. Estimated Annual Revenue Collection

Buayan Airport has two major sources of cash revenue. These are 1) the lease/concession rentals of airport terminal space to commercial airlines and auxiliary businesses (e.g. portorage, canteen, etc.) and 2) the terminal and security fees collected from outgoing passengers. The estimated annual revenue for Buayan Airport is presented in Table 8. Over the last five years (1985 to 1989), the estimated average annual cash revenue of the Airport was P105,106.80.

Revenues from lease or concession rentals of terminal space are basically fixed. Revenues from security and terminal fees fluctuate according to the number of outgoing passengers. However, security and terminal fees accounted for 83 percent of the average annual revenue of the Airport. The total annual revenue of the Airport increases proportionately with the increases in the number of air commuters (but not from freight). Thus, if the Airport will be upgraded, it would accomodate greater volume of passenger traffic, the revenue collection is expected to increase substantially and can go even higher if some volume related fee is also applied to air freight passing through the Airport.

Table 8. Estimated Annual Revenue Collection, Buayan Airport, General Santos City.

Year	Source of Revenue				Total
	Concessionaires:	Passenger:	Terminal:		
	Rentals	Security	Fees		
1985	17,746	47,742	23,871		89,359
1986	17,746	52,404	26,202		96,352
1987	17,746	56,772	28,386		102,904
1988	17,746	55,218	27,609		100,573
1989	17,746	79,068	39,534		136,348
Annual Average	17,746	58,241	29,120		105,107

Source: DOTC-ATO, Buayan Airport, General Santos City

* Based on the total monthly rental payment of ₱1,478 of concessionaires (See Table 6a for details).

** Based on the number of outgoing passengers and a fee of ₱3.00 and ₱1.50 for security and terminal, respectively.

Table 8a. Buayan Airport Concessionaires and their
Monthly Rentals, as of August 1990.

Concessionaires	Monthly Rental (Pesos)
1. Commercial Airlines:	
- Philippine Airlines	932.80
2. Air Cargo Forwarder:	
- LBC Air Cargo	100.00
3. Porterage:	
- Crispin del Rio	120.00
4. Canteens/Restaurants	
- Amancio, R.	30.00
- Azucena, J.	38.00
- Caminay, J.	43.00
- Codina, A.	65.00
- Demontiverde, P.	38.00
- Vega, B.	43.00
- Tobias, B.	69.00
Sub-total	326.00
TOTAL	1,478.80

Source: DOTC-ATO, Buayan Airport,
General Santos City

3.0. Proposed Upgrading and Investment Costs

Originally, the Buayan Airport upgrading project was conceived on the basis of anticipated needs for sufficient air cargo capacity to transport products processed in the agro-processing complex proposed for General Santos City. Even if this proposed agro-processing complex is not implemented, the demand for adequate air transport services is increasing significantly due to the rapid development in this part of the country.

As proposed, the basic objectives of the Buayan Airport upgrading project -is to increase the capacity as well as efficiency of the airport to handle increased air traffic and larger aircraft through improved airport structures and operational facilities. In order to attain this objective, the project considers four development components, namely: (a) extension of the runway; (b) construction of an apron and taxiway; (c) upgrading of land side facilities; and (d) upgrading of air navigation facilities.

The existing runway will be extended by 530 m. This subcomponent will also include the removal of an obstruction in the approach of runway, reclamation work, and the concrete overlay of the existing asphalt runway, with the existing apron and taxiway being relocated and reconstructed. A schematic diagram of Buayan Airport indicating some of these development activities is presented in Figure 3.

The upgrading of the land side facilities will include construction of the following buildings: a passenger terminal, a cargo terminal, and a fire station; the construction of a vehicle parking area (VPA) and access road; the construction of perimeter fences; and terminal area site development including landscaping.

Upgrading of air navigation facilities includes procurement and installation of the air navigation equipment, instruments and facilities such as the FSS/control tower building, airfield lighting system, control tower/approach control (ADC/APP) equipment, VOR and DME.

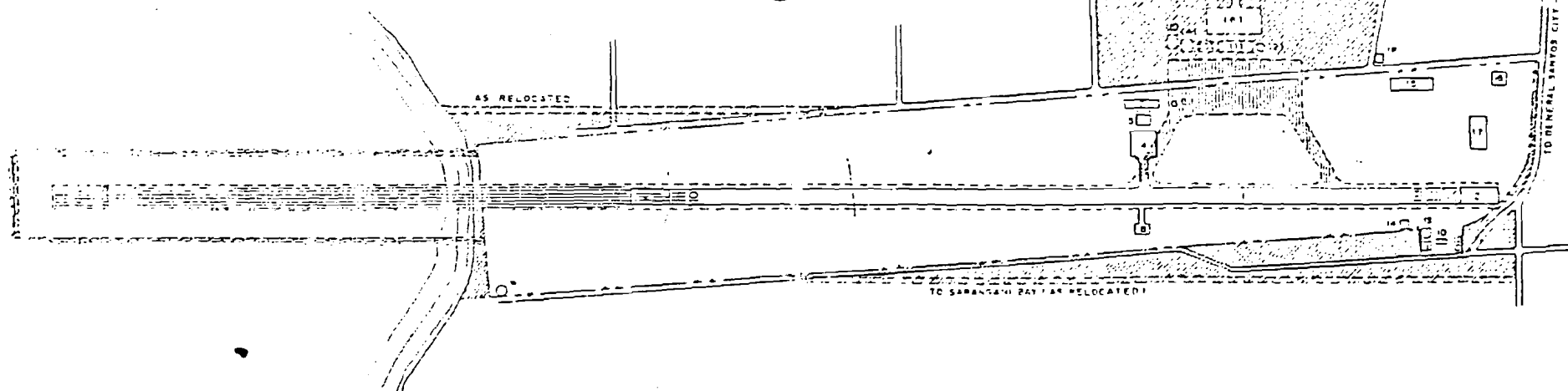
Detailed specifications of the various cost items for this upgrading proposal are presented in Annex A. This airport upgrading project proposal would involve an estimated total outlay of P268.3 M at 1988 prices. The same project proposal was reviewed and evaluated in an earlier effort. The results of their review, with recommendation are presented in Annex A. Several limitations of the above upgrading scheme have been identified, and thus, several alternative development schemes for Buayan Airport have been presented:

007.1 008.0 009.0 010.0 011.0 012.0 013.0 014.0 015.0 016.0 017.0 018.0 019.0 020.0 021.0 022.0 023.0 024.0 025.0 026.0 027.0 028.0 029.0 030.0 031.0 032.0 033.0 034.0 035.0 036.0 037.0 038.0 039.0 040.0 041.0 042.0 043.0 044.0 045.0 046.0 047.0 048.0 049.0 050.0 051.0 052.0 053.0 054.0 055.0 056.0 057.0 058.0 059.0 060.0 061.0 062.0 063.0 064.0 065.0 066.0 067.0 068.0 069.0 070.0 071.0 072.0 073.0 074.0 075.0 076.0 077.0 078.0 079.0 080.0 081.0 082.0 083.0 084.0 085.0 086.0 087.0 088.0 089.0 090.0 091.0 092.0 093.0 094.0 095.0 096.0 097.0 098.0 099.0 100.0 101.0 102.0 103.0 104.0 105.0 106.0 107.0 108.0 109.0 110.0 111.0 112.0 113.0 114.0 115.0 116.0 117.0 118.0 119.0 120.0 121.0 122.0 123.0 124.0 125.0 126.0 127.0 128.0 129.0 130.0 131.0 132.0 133.0 134.0 135.0 136.0 137.0 138.0 139.0 140.0 141.0 142.0 143.0 144.0 145.0 146.0 147.0 148.0 149.0 150.0 151.0 152.0 153.0 154.0 155.0 156.0 157.0 158.0 159.0 160.0 161.0 162.0 163.0 164.0 165.0 166.0 167.0 168.0 169.0 170.0 171.0 172.0 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GENERAL SANTOS AIRPORT

SCALE

1 : 8,000 M.



EXISTING :

1. RUNWAY - 1490m x 30m - ASPHALT
2. STOPWAY - 01/19 - 70m/75
3. TAXIWAY - 1 - 60m x 18m - ASPHALT
4. APRON - 50m x 50m - ASPHALT
5. TERMINAL BUILDING
6. ELEVATED WATER TANK
7. VEHICULAR PARKING AREA
8. FIRE SHED
9. VOR
10. PAL OFFICE
11. ATO TERMINAL SHED
12. PAL POWER HOUSE
13. FSS BUILDING/FIRE SHED
14. POWER HOUSE FOR VOR

15. OFFICE OF THE INFORMATION DIVISION
16. DEPUTY HEADQUARTERS
17. BRIGADE HEADQUARTERS
18. NDB

PROPOSED :

- SITE ACQUISITION FOR LANDSIDE FACILITIES, RELOCATION OF APRON, ROAD & STRIP WIDTH CORRECTION
- RUNWAY EXTENSION - 1040m x 45m - PCCP AND STOPWAY 100m x 45m - MAC.
- CONSTRUCTION OF APRON - 250m x 100m PCCP AND TAXIWAY - 2 - 23m x 150m PCCP
- CONSTRUCTION OF TERMINAL BLDG. (1), WATER SYSTEM (2), CARGO TERMINAL BLDG. (3), FSS/TOWER BLDG & POWER PLANT (4), FIRE STATION BLDG. (5) AND VPA & ACCESS ROAD (6)
- RUNWAY WIDENING FROM 30m TO 45m

- RELOCATION OF ROAD TO SARANGANI BAY
- CONSTRUCTION OF CHB PERIMETER FENCE
- RELOCATION OF NDB
- RECLAMATION WORKS

BEST AVAILABLE DOCUMENT

Scheme I: (Original Project Proposal)

1. Upgrade the existing airport with all the necessary facilities.
2. Close the Buayan Airport for one year while the asphalt runway is overlain with a thicker concrete pavement;
3. Use Allah Valley Airport (70 kms away) or the Davao Airport (120 kms away) as temporary General Santos City Airport;
4. Transfer the new passenger terminal away from the runway (will result in a wider but very short public parking area):

Estimated total cost P 268.3 M

Scheme II:

1. Upgrade the existing airport same as Scheme I, except step 3;
2. Develop a new temporary air strip 1,300m x 30m with asphalt pavement at Barangay Apopong with a temporary terminal building;
3. The temporary air strip can be converted for General Aviation after completion of the upgrading, if so desired:

Estimated total cost P 390.8 M.

Scheme III:

1. Suspend the upgrading of the existing Buayan Airport which can eventually be assigned for General Aviation;
2. Develop a brand new semi-international airport at Barangay Apopong with the same standards as Davao or Zamboanga Airports;
3. This new airport would be straddling on the Saboay River which may require a runway with a well-designed bridge;
4. Continue to use the Buayan Airport while new airport is under construction;

Estimated total cost P 800.0 M

Scheme IV:

1. Upgrade the existing Buayan airport complete with all the necessary facilities;
2. Buy additional real estate at the east side of the runway;
3. Reclaim from the shoreline of Sarangani Bay a strip 120m. wide by 600m. long;
4. Construct a new concrete runway parallel to the existing asphalt runway of sufficient width and length to accommodate A-300, B-747 and C-130 cargo planes. The standards can be the same as those of Davao or Zamboanga airport;
5. It is no longer necessary to transfer the newly built passenger terminal building. There is sufficient space to accommodate cargo terminal building and other structure and amenities;
6. The existing asphalt runway shall later be used as taxiway and also for emergency purposes.

Estimated total cost P 486.5 M

The development Scheme no. IV, which is basically the original project proposal (Scheme No. I) plus the construction of new runway, capable of handling B-747, built parallel to the existing runway, has been strongly recommended for consideration in the upgrading of Buayan Airport. This scheme envisions upgrading this airport into a semi-international standards that are comparable with the Davao City and Zamboanga City Airports.

For purposes of this pre-feasibility study, development Scheme No. IV will be used in the analysis of the upgrading project. The decision to use development Scheme No. IV has been made in view of the strong recommendation made by the earlier study. It is recognized at this point that such a recommendation has not been supported by economic criteria. Thus, if and when a comprehensive feasibility study of the Buayan Airport upgrading will be undertaken, the different development schemes must equally deserve full technical and economic studies in order to be able to arrive "at the best" the policy decision possible.

4.0 Anticipated Potential of the Airport Upgrading Project

The Airport Project's influence area, particularly General Santos City and the province of South Cotabato, has significant potential for economic growth and development. This high potential has in one way or the other, been hindered by the absence of efficient transport system. The need for an express transport service is particularly urgent for high valued perishable products (e.g., fresh fish, animal carcasses, fruits and vegetables) which must be transported to the ultimate market in the shortest time possible. The airport project's influence area (in particular, and in the Southern Mindanao Region, in general) has been the nation's major exporter of perishable products (particularly, tuna and fruits). Thus, the development of an express transport system can further influence agricultural and commercial activities and economic growth in this part of the country.

4.1 Anticipated Increased Volume of Air Traffic

In terms of the volume of air traffic movement, the demand for the services of Buayan Airport is rapidly increasing (at the rates of 14.0 % and 57.0% per annum for passenger and freight, respectively). During the last five years, 1985 to 1989, the average annual number of passengers served at this Airport was 39,620 -19,203 and 20,417 incoming and outgoing passengers, respectively. Once the proposed major upgrading and development of the Airport is fully completed, it is expected that the volume of air traffic served by this airport would dramatically increase. It is anticipated that the number of passengers that would be served at this airport would increase by more than 400 percent. This estimate is based on the estimated number of passengers at the Davao City Airport that travelled to/from General Santos City and nearby municipalities (Table 9).

General Santos City and its neighboring municipalities are within the Buayan Airport influence area; therefore, air traffic (passenger and freight) travelling within this area would no longer be flown to/from Davao City Airport once Buayan Airport is fully upgraded so as to provide comparable services. Based on growth rates during the last five years, the projected annual volumes of air traffic movement at Buayan Airport for the with and without project conditions is presented in Table 10.

Table 9. Air traffic movements (passengers and freight) at Davao City Airport and estimated volume of air traffic To/From General Santos City and South Cotabato Area, 1985-89.

Year	Commercial (PAL)		General Aviation		Traffic To/From GSC/SC Area*	
	Incoming	Outgoing	Incoming	Outgoing	Incoming	Outgoing
1. Passenger Traffic						
1985	171850	178606	8533	8628	51555	53582
1986	182427	184858	8609	10503	54728	55457
1987	207151	211270	9860	8948	62145	63381
1988	219901	224622	8200	9388	65970	67387
1989	212650	217481	8253	9970	63795	65244
Average Volume	198796	203367	8691	9487	59639	61010
Growth Rate						
1985-86	6.15	3.50	0.89	21.73	6.15	3.50
1986-87	13.55	14.29	14.53	-14.81	13.55	14.29
1987-88	6.15	6.32	-16.84	4.92	6.15	6.32
1988-89	-3.30	-3.18	0.65	6.20	-3.30	-3.18
Annual Average	5.64	5.23	-0.19	4.51	5.64	5.23
2. Freight/Cargo Traffic (kgs.)						
1985	3403084	3175550			1020925	952665
1986	4673394	3940361			1402018	1182108
1987	5747236	5389207			1724171	1616762
1988	5315601	5169250			1594680	1550775
1989	5526017	6506753			1657805	1952026
Average Volume	4933066	4836224			1479920	1450867
Growth Rate						
1985-86	37.33	24.08			37.33	24.08
1986-87	22.98	36.77			22.98	36.77
1987-88	-7.51	-4.08			-7.51	-4.08
1988-89	3.96	25.87			3.96	25.87
Annual Average	14.19	20.66			14.19	20.66

* Traffic volume to/from the GSC/SC area was estimated to be about 30% of the total traffic movement at Davao City Airport; this estimate of the proportion of the traffic volume to/from GSC/SC area was provided by Mr. James Hannen, PAL Regional Director.

Source: DOTC-ATO, Davao Airport, Davao City.

Table 9a. Total number of aircraft served (landing and take-off) at Davao Airport, Davao City, 1985-1989.

Year	Type of Aircrafts		Total
	Commercial	General Aviation	
1985	2040	3368	5408
1986	2147	3735	5882
1987	2461	3316	5777
1988	2503	3690	6193
1989	2300	3740	6040
Daily Average	6.27	9.78	16.05
Annual Average	2270.20	3569.80	5860.00
Growth Rate (%)			
1985-86	5.25	10.90	8.76
1986-87	14.63	-11.22	-1.79
1987-88	1.71	11.28	7.20
1988-89	-8.11	1.36	-2.47
Annual Average	3.37	3.08	2.93

Source: DOTC-ATO, Davao Airport, Davao City.

Table 10. Projected air traffic movement (passengers) ferried by commercial aircraft at Buayan Airport, General Santos City, With and Without Project Condition.

Year	Without Project		With Project		Difference	
	Incoming	Outgoing	Incoming	Outgoing	Incoming	Outgoing
1989	24,154	26,356	-	-	-	-
1990	27,724	30,215	-	-	-	-
1991	31,822	34,638	-	-	-	-
1992	36,525	39,709	-	-	-	-
1993	41,923	45,522	-	-	-	-
1994	48,119	52,187	-	-	-	-
1995	55,231	59,827	-	-	-	-
1996	63,395	68,586	157,061	161,807	93,667	93,222
1997	72,764	78,626	171,714	176,724	98,950	98,097
1998	83,519	90,137	188,049	193,365	104,530	103,228
1999	95,863	103,334	206,289	211,960	110,426	108,627
2000	110,032	118,462	226,685	232,769	116,654	114,308
2001	126,294	135,804	249,527	256,090	123,233	120,286
2002	144,961	155,686	275,144	282,263	130,183	126,577
2003	166,386	178,479	303,912	311,676	137,526	133,197
2004	190,978	204,608	336,260	344,771	145,282	140,163
2005	219,204	234,562	372,680	382,056	153,476	147,494
2006	219,204	234,562	372,680	382,056	153,476	147,494
2007	219,204	234,562	372,680	382,056	153,476	147,494
2008	219,204	234,562	372,680	382,056	153,476	147,494
2009	219,204	234,562	372,680	382,056	153,476	147,494
2010	219,204	234,562	372,680	382,056	153,476	147,494
2011	219,204	234,562	372,680	382,056	153,476	147,494
2012	219,204	234,562	372,680	382,056	153,476	147,494
2013	219,204	234,562	372,680	382,056	153,476	147,494
2014	219,204	234,562	372,680	382,056	153,476	147,494
2015	219,204	234,562	372,680	382,056	153,476	147,494
2016	219,204	234,562	372,680	382,056	153,476	147,494
2017	219,204	234,562	372,680	382,056	153,476	147,494
2018	219,204	234,562	372,680	382,056	153,476	147,494
2019	219,204	234,562	372,680	382,056	153,476	147,494
2020	219,204	234,562	372,680	382,056	153,476	147,494
2021	219,204	234,562	372,680	382,056	153,476	147,494
2022	219,204	234,562	372,680	382,056	153,476	147,494
2023	219,204	234,562	372,680	382,056	153,476	147,494
2024	219,204	234,562	372,680	382,056	153,476	147,494
2025	219,204	234,562	372,680	382,056	153,476	147,494

4.2 Potential Reduction in the Operation & Maintenance Costs of Air Transport

Operation and maintenance (O&M) costs for transport services vary considerably for various types and sizes of aircraft. A comparative analysis of the O&M costs of the different types of PAL aircraft is presented in Table 11. On a per hour basis, the jet planes' (A-300, BAC-111 or B-737) O&M costs are comparatively much higher than the smaller turbo-prop F-50 planes. However, if cargo hold capacities and effective speeds of these aircrafts are taken into account, it is estimated that the effective costs of transport service per passenger-km. for the large jets is significantly much lower than for the F-50 planes. Per passenger-km, the effective cost of transport services is estimated to be P0.52 for F-50 planes compared to P0.10 to P0.26 for the jets. On the average, it is estimated that about P0.35 per passenger-km transport services cost could be saved if the F-50 planes were to be replaced by jets.

The use of a more efficient jet instead of the F-50 planes is possible only if the necessary airport facilities (the runway, in particular) are properly developed. The proposed upgrading of Buayan Airport would allow large jets (A-300, B-737 or BAC-111) to serve General Santos City; thus, it could be expected that commercial airlines would benefit through significant reductions in O&M costs for their transport services.

Table 11. Estimated per hour operation and maintenance (O & M) costs by types of commercial aircraft in the Philippines.

Type of Aircraft	Per Hour O & M Cost ^{1/}	Cost per Passenger-air kilometer ^{2/}
A - 300	31,017.34	0.23
BAC- 111	15,782.97	0.26
B - 737	7,718.49	0.10
F - 50	9,012.16	0.52

^{1/} Based on PAL 1990-1991 budget estimates provided by PAL Corporate Planning.

^{2/} Calculations based on the aircrafts' PAX seats and effective aircraft speed (including take-off and landing time) as presented in Table 12.

Table 12. Cargo hold capacity and estimated average effective speed of domestic commercial aircrafts (PAL), Philippines.

Type of Aircraft	Cargo Hold Capacity			Est. Average Effective Speed (km./hr.)*
	Volume (cu.m.)	Weight (kgs.)	PAX Seats	
A - 300	91.90	30,600	246	550
BAC- 111	19.54	5,630	109	550
B - 737	30.24	4,838	141	550
F - 50	7.23	1,875	54	320

Source: PAL Corporate Planning, August, 1990.

* Average effective speed was estimated based on the air km. distance between airports and total travel time which includes taking-off and landing time; average speed varies by 10% (+/-) from the above depending upon distance travelled (e.g. shorter distance result in lower average speed).

4.3 Potential Savings in Transport Cost for Commuter and Freight

At present Buayan Airport can only handle light to medium aircraft, such as the Fokker-50 and SD-360. Flying to General Santos City from Manila takes approximately two hours and forty-five minutes via Cebu City. However, with occasional weather disturbances in Cebu and the limited flights between Cebu City and Gen. Santos City, a significant volume of air traffic (passenger and freight) has to be flown via Davao City. This involves an additional three to four hours of land transport time.

Considering the opportunity cost of time, plus bus or taxi fares for passengers and trucking expenses and the handling losses (spoilage) for freight, significant amounts could be saved if Buayan Airport is fully upgraded. Estimates of the potential savings in the costs of passenger and freight transport are presented in Table 13. If the estimated savings of P56.75 per passenger and P3.54 per kg. freight are extrapolated to the total volume of General Santos City air traffic that would no longer fly via Davao City Airport, the total potential project benefits due to transport savings would be substantial.

The potential reduction in the transport costs is also expected to influence farm gate prices for exported perishable products, such as fish, fruits and vegetables. It is highly possible that traders would increase their buying price at the farm level. Such an increase in farm gate prices would consequently influence production. In effect, then the Buayan Airport upgrading project would also benefit agricultural producers. The anticipated potential impacts of the project on agricultural production is presented in Section 4.4.

Table 13. Estimated total costs for General Santos City air traffic (passenger and freight) enroute to Manila via Buayan and Davao City Airports.

Particular	Alternative Airports		Cost Difference
	Buayan	Davao City	
Passenger:	(per person)		
Plane fare ^{a/}	1,707.00 (1,876.00)	1,728.00	21.00 (148.00)
Bus/Taxi fare ^{b/}	-	111.00	111.00
Opportunity Costs ^{c/}	-	93.75	93.75
Total	1,707.00 (1,876.00)	1,932.75	225.75 (56.75)
Freight:	(per kg.)		
Plane rate ^{a/}			
Express cargo	8.46	7.92	(0.54)
General cargo	6.06	5.68	(0.38)
All Types	7.26	6.60	(0.46)
Trucking Costs	-	3.00	3.00
Spoilage ^{d/}	-	1.00	1.00
TOTAL	7.26	10.60	3.54

^{a/} Based on PAL economy rates which applied to A-300, B-737 or BAC 1-11 as of June, 1990; figures in parenthesis are the adjusted fares once Buayan Airport is served by commercial jets;

^{b/} Cost of bus fare at ₱61.00 from General Santos City to Davao City proper plus ₱50.00 taxi fare from Davao City proper to Airport.

^{c/} Opportunity cost of time spent (about 3 hours) from General Santos City to Davao City Airport at ₱31.25/hr.; based on daily average income of ₱250 for middle to upper income groups.

^{d/} Based on PAL average rates.

^{e/} Based on the average cost of ice used to prevent spoilage of fresh fish.

4.4 Potential Increase In Production of Perishable Export Products

Express transport services play a critical role in the production and marketing of highly valued perishable products, such as tuna, prawns and vegetables. The basic theoretical model illustrating the potential impact of an airport upgrading project on the perishable products industry is presented in Annex B. It is expected that prices of perishable products would significantly increase as express transport services to ultimate consumers' market are made possible with the major upgrading of Buayan Airport. Such product price increases would consequently influence increased production. The net value added (NVA) (which is gross value of production less production cost) of the increase in production due to airport upgrading would also constitute part of the project's benefits.

In this present study, we consider the fishery sector as one of the major beneficiaries of the Buayan Airport upgrading project. The expected increases in fishery production due to the airport upgrading project was estimated, using the following formula:

$$dQ = Q_1 - Q_0 = [(dP_q) (E_q)]$$

where:

dQ = the increase in volume of exported fishery product due to Buayan Airport upgrading project; assuming that aircraft availability is not a problem;

Q_0 = Volume of exported fishery product without the project most of the exported fish are transported via Davao City Airport;

Q_1 = expected volume of exported fishery products if the Airport is fully upgraded and operational and that there will be direct flight services to Manila and other major commercial centers;

E_q = supply elasticity of price for fishery products;

dP_q = percent change in the of price of fishery products at the fish landing level and this is computed as:

$$dP_q = \frac{(P_{q1} - P_{q0})}{P_{q0}} \cdot 100$$

P_{q0} = price of fishery products at the fish landing level without the project;

P_{q1} = price of fishery products at the fish landing level with the project.

The fish supply elasticity estimate of 0.30 that were used in this analysis is based on an earlier study (DPWH-PHI-ADB, 1988). The supply elasticity of prices for fish from various sources are generally "inelastic". Thus, no appreciable increase in the supply of fish can be expected even if there is substantial increase in fish prices. This could be explained by the nature of the industry.

The potential increase in fishery product price was estimated based on the assumption that a fish trader would increase his buying price at the fish landing level by as much as fifty percent (or more) of the land transport costs which they would save per unit product once the Buayan Airport is fully upgraded. The basic information on fishery production, estimated volume of export, average prices of fishery product, production cost per unit and projected price of the products that were used in the estimation of the project benefits due to the NVA in the increase fishery production in project influence area is presented in Table 14. The average annual NVA in accruing to the increase in fishery export due to the project is estimated to be about P4.3M.

Similar procedures have been followed to estimate the potential impact on production of other perishable products (fruits and vegetables). The estimated increases in production of major fruits in the project influence area are presented in Table 15. Based on average production cost and production prices, it is estimated that the average annual NVA in increased production of fruits which could be attributed to the Airport Project is about P2.3M. There are other types of fruits grown in the area, therefore, this estimate of project benefit due to fruit production is understated.

Vegetable production is highly favorable in the project area due to excellent environmental conditions. Prices of vegetables in major urban centers (Metro Manila) are significantly higher than in South Cotabato. The upgrading of the Airport is also expected to influence farm gate prices and consequently the level of production. The anticipated project benefit in vegetable production are estimated in Table 15. It is estimated that vegetable production in the project area would increase by at least 521.35 m.t. per year. With this increase in production, the estimated total NVA in vegetable production due to the project is about P4.6M.

Table 14. Fish production, estimated volume of exported fish (primarily tuna) and estimated volume and net value added of increased fish export due to Buayan Airport Upgrading Project.

=====	
Particular	1989

Production (m.t.) ^{a/}	
Commercial	78,251
Municipal	10,773
Inland	154
T o t a l	----- 89,178
Estimated volume of fishery export (m.t.) ^{b/}	24,970
Fish price at landing (P/kg.):	
a) Without Project	41.25
b) With Project	42.75
Production cost/kg. (P) ^{c/}	27.00
Estimated NVA/kg. (P)	15.75
Estimated Increased Volume of fishery export (m.t.) ^{d/}	272.67
Estimated total NVA of increased volume of fishery export (P)	4,294,590
=====	

^{a/} Based on DA-BAS Statistics, South Cotabato.

^{b/} Estimated at 28% of total landed fish (based on the PFDA-AOC, GSC. Survey of landed fish distribution.

^{c/} Based on the cost of palakaya tuna operation, reported by Sin Consult (1990)

^{d/} Projected based on supply elasticities of price for fish of 0.30 (Source: The Phil. Fishery Sector: Supply Response of Fisheries Products. Phil: National Road Improvement Project. DPWH-PHI - ADB, 1988.

Table 15. Anticipated potential increases in volume and net value added (NVA) of production of fruits in the Airports Project influence area.

Particular	Value
Citrus (Mandarin)	
Production (m.t.)	10,314.00
Farm gate price (P/kg):	
Without project	10.50
With project	13.50
Production costs/kg.	6.00
Estimated NVA/kg.	6.50
Potential increase in volume of production (m.t.)	295.00
Estimated total NVA of increased production	P1,917,500
Mango	
Production (m.t.)	1,592.00
Farm gate price (P/kg):	
Without project	15.00
With project	18.00
Production costs/kg.	2.66
Estimated NVA/kg.	12.34
Potential increase in volume of production (m.t.)	29.00
Estimated total NVA of increased production	P357,860

Supply elasticities of price: 0.10 for citrus and 0.09 for Mango (Source: Supply Response in Philippine Agriculture, Eco. Report No. 2 National Road Improvement Project. DPWH-PHI-ADB, 1988).

Based on farm budgets of production (Source: Farm Budgets for Selected Regions Eco. Report No. 4 National Road Improvement Project, DPWH-PHI-ADB, 1988).

Table 16. Anticipated potential increases in volume and net value added (NVA) of production of vegetables in the Airport Project influence area.

Particular	Value
Vegetables (Composite)	
Production (m.t.) ^{a/}	17,219.00
Farm gate price (P/kg):	
Without project	11.89
With project	13.39
Production costs/kg. ^{b/}	3.10
Estimated NVA/kg.	8.79
Potential increase in volume of production (m.t.)	521.35
Estimated total NVA of increased production	P4,582,667

Supply elasticities of price for vegetables is estimated at 0.24 (Source: Supply Response in Philippine Agriculture Eco. Report No.2 National Road Improvement Project, DPWH-PHI-ADB, 1988).

^{a/} Source: Comprehensive Opportunities for a Moving Economy at General Santos City.

^{b/} Based on farm budgets of production (Source: Farm Budgets for Selected Regions Eco. Report No.4 National Road Improvement Project, DPWH-PHI-ADB, 1988).

4.5 Other Potentials of the Airport Project

The efficient and cheaper express transport system that would be made possible by the upgrading of Buayan Airport is also expected to influence tourism development in General Santos City and nearby municipalities. It is expected that tourist visits in the area would significantly increase. Such increase in tourist visits would certainly have economic multiplier effects on the local economy. Hence, economic activities of tourism industry related industries (such as hotels, restaurants and amusement parks) as well as other commercial enterprises are expected to increase substantially.

It is also expected that once the Buayan Airport is upgraded into at least semi-international category, multinational investment would be attracted into the project influence area. Given that Southern Mindanao is a major source of Philippine exports, prospective investors would be encouraged to do business in the area as a result of the Airport Project.

5.0. An Indicative Economic Feasibility Analysis

Detailed technical (e.g. engineering) and economic information which are essential for a comprehensive analysis of the project's worthiness have yet to be generated. Thus, the analysis that follows is only an indication of the economic worthiness of the project. The analysis makes use of cost estimates which have been reported in an earlier study; these are presented and reviewed in Section 3.0 of this report.

This economic pre-feasibility analysis assumes that Buayan Airport will be upgraded following the recommended development Scheme No. IV which is presented in Section 3.0. This would mean that Buayan Airport will be transformed into Class A (International Airport), comparable to the Davao City Airport.

5.1. Project Costs

Upgrading Buayan Airport would involve two major cost items, namely: (a) initial capital investment costs for the development of airport infrastructure and facilities; and (b) added recurrent (O&M) costs due to the increases in airport operations and maintenance of the additional, more modern infrastructure. The estimated total project cost stream over a 35 year accounting period is presented in Table 17.

5.1.1. Initial Capital Investments

The capital investment for upgrading Buayan Airport to a standard comparable to Davao City Airport was estimated to be P486.5M. This estimate was based on the proposed development scheme (Scheme IV) described in Section 3.0. The details of this capital investment requirement are presented in Table 18. Upgrading of the airport's facilities as well as the construction of a parallel runway is assumed to be completed in five years, possibly less. For purposes of this economic pre-feasibility study, all of the construction and development activities of the project are assumed to be implemented from 1991 to 1995 and the necessary capital outlays will be spent or invested in equal annual proportion over the five years.

5.1.2. Added Recurrent (O & M) Costs

The present budget for operating and maintaining Buayan Airport will be inadequate once the airport is fully upgraded. Additional manpower will be required not only to manage and maintain new airport facilities and infrastructure but also for changed and increased operational activities due to the increase volume of air

Table 17. Estimated capital investment and added recurrent (O & M) cost for Buayan Airport Upgrading/Improvement Project.

Year	Capital Inv't : Outlays (in	Added Recurrent : (O & M) Costs : Million	Total Costs : Pesos)
1991	97.90		97.90
1992	97.90		97.90
1993	97.90		97.90
1994	97.90		97.90
1995	97.90		97.90
1996		5.68	5.68
1997		5.68	5.68
1998		5.68	5.68
1999		5.68	5.68
2000		5.68	5.68
2001		5.68	5.68
2002		5.68	5.68
2003		5.68	5.68
2004		5.68	5.68
2005		5.68	5.68
2006		5.68	5.68
2007		5.68	5.68
2008		5.68	5.68
2009		5.68	5.68
2010		5.68	5.68
2011		5.68	5.68
2012		5.68	5.68
2013		5.68	5.68
2014		5.68	5.68
2015		5.68	5.68
2016		5.68	5.68
2017		5.68	5.68
2018		5.68	5.68
2019		5.68	5.68
2020		5.68	5.68
2021		5.68	5.68
2022		5.68	5.68
2023		5.68	5.68
2024		5.68	5.68
2025		5.68	5.68
Present Value at 15%	328.18	18.54	346.72

* Estimated based on the difference between the average annual O & M costs of Davao City and GSC/Buayan Airports (P6,741,504 - P1,066,480 = P5,675,024).

Table 18. Estimated total capital investment outlays
for Buayan Airport Upgrading.

Particular	Local	Foreign	Total
	(In Million Pesos)		
- Extension of existing runway	4.3		4.3
- Removal of obstructions	0.2		0.2
- New apron & taxiway	15.6		15.6
- Access road	2.0		2.0
- Control tower building	2.0		2.0
- FSS	0.5		0.5
- ADC/APP		1.1	1.1
- Fire station	1.3		1.3
- Lighting system		15.5	15.5
- Fire trucks		7.8	7.8
- VOR & OME	0.4		0.4
- VASI		1.7	1.7
- Yardwork/landscaping	2.2		2.2
- Vehicle parking area	3.5		3.5
- New concrete runway	356.5		356.5
Sub-total	388.5	26.1	414.6
2% Mobilization			8.3
15% A & E Services etc.			63.4
TOTAL			486.3

traffic. Additions to the budget for repair and maintenance of new airport facilities and infrastructure would also be necessary.

In this analysis, we estimated the added recurrent (O & M) costs for the upgraded airport based on the O & M costs of the Davao City Airport (Table 19). The difference between the present O & M costs of Davao City Airport and Buayan Airport, was used as an estimate for added recurrent (O & M) costs once the Buayan Airport is fully upgraded. The decision to use Davao City Airport O & M costs as a basis for estimating the added recurrent costs was based on the fact that the proposed upgrading project would transform Buayan Airport into a standard that is comparable to Davao City Airport, and because Davao and Buayan would then serve similar markets.

5.2. Project Benefits

Major upgrading of Buayan Airport, to an international category (Class A) would certainly generate significant benefits. Among the directly observable project benefits considered in this analysis are: (a) the increase in airport operating revenue; (b) the reduction of the effective O&M costs of air transport services; (c) the savings of local transport costs for passengers and freight; and (d) the net value added (NVA) of the increases in production of exported, perishable products (primarily fishery products). The projected benefit streams from these sources are presented Table 20. Other benefits such as the NVA due to increased tourism and commercial activities in the project influence area are also expected to be substantial but are not accounted in this present analysis because such potential benefits could not be solely attributed to the Airport Project. The project benefits that were accounted in this present analysis were estimated as follows:

5.2.1. Increase in Airport Operating Revenue

As presented earlier, the airport has two major sources of cash revenues; 1) concession rentals of airport facilities, and 2) fees paid by passengers for the use of the terminal and for security services. Another possible source of revenues could be landing fees for international as well as domestic aircraft, given that the Project Airport is to be developed in to a Class A standard.

Table 19. Anticipated future annual O & M costs of the fully upgraded Buayan Airport ^{2/}

=====	
Particular	Costs (pesos)

1. Personal Services:	
- Salaries	2,920,642
- Wages + COLA	1,460,865
- Tech. Incentive Allowance	714,450
- Night & Overtime Diff.	180,671
- Allowances (uniform+bonus)	674,747
Sub-total	5,951,375
2. Repair & Maintenance:	
- Travelling expense	45,721
- Comm. Services	26,760
- Repair of facilities, equipment & vehicles	209,971
- Fuel & oil	
- Spare parts	
- Supplies & Materials	80,000
- Representation expenses	3,600
- Water & power	326,075
- Other services	98,000
Sub-total	790,127

TOTAL	6,741,502
=====	

^{2/} Based on the Davao City Airport annual O & M costs.

Table 20. Projected detailed annual benefit streams for Buayan Airport Project.

Year	Increase in : Airport Revenue	O&M Savings : Commercial : Airlines	Transport Cost Savings : Passenger	Freight	NVA of Inc. : Prod'n. of : Perish. Prod.:	Total
1991	-	-	-	-	-	-
1992	-	-	-	-	-	-
1993	-	-	-	-	-	-
1994	-	-	-	-	-	-
1995	-	-	-	-	-	-
1996	903,425	53,569,954	10,605,926	52,841,341	11,148,027	129,068,672
1997	937,553	58,537,539	11,182,409	56,011,821	11,216,607	137,885,931
1998	973,467	64,077,631	11,790,272	59,372,531	11,285,873	147,499,774
1999	1,011,258	70,265,834	12,431,225	62,934,882	11,355,832	157,999,033
2000	1,051,027	77,188,405	13,107,072	66,710,975	11,426,490	169,483,969
2001	1,092,875	84,943,792	13,819,714	70,713,634	11,497,855	182,067,870
2002	1,136,911	93,644,404	14,571,158	74,956,452	11,569,934	195,878,860
2003	1,183,251	103,418,635	15,363,520	79,453,839	11,642,733	211,061,979
2004	1,232,015	114,413,182	16,199,031	84,221,069	11,716,261	227,781,557
2005	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2006	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2007	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2008	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2009	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2010	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2011	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2012	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2013	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2014	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2015	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2016	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2017	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2018	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2019	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2020	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2021	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2022	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2023	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2024	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
2025	1,283,328	126,795,709	17,080,044	89,274,334	11,790,523	246,223,938
Total						
Present Value						
at 15%	3,567,256	287,024,686	45,134,922	231,360,735	37,478,903	604,566,501

Project benefits due to increased cash revenue collection were estimated based on projected increases in air traffic (passengers) along with greater airport facilities to be rented and the adjusted rate of fees for terminal and security services as well as the adjusted rates of rentals for concessionnaires. The projected added annual operating revenue of the fully upgraded Airport is presented in Table 21.

5.2.2 Savings in the O&M Costs of Air Transport Services

The project benefits due to the savings of the airlines' O&M costs in transporting passengers and freight were derived based on the assumption that the small aircraft (F-50) will be replaced by larger and more fuel efficient aircraft (such as B-737 or A-300), once the airport is upgraded and operational. This benefit is related to the concept of "economies of scale" wherein the effective O&M costs of B-737 or A-300 in ferrying passenger and freight is significantly much lower than such costs for the F-50. A comparison of the per hour O&M costs and the estimated cost per passenger-km for the different types of commercial aircraft in the country was presented earlier (Table 11).

Based on the O&M costs and the effective transport speed (including take-off and landing time) of the different aircraft, it is estimated that an average of P0.35 in O&M costs could be saved per passenger-km, if the usual F-50 carriers were replaced with jets (B-737 or A-300). Replacement of the type of aircraft that serve Buayan Airport would be possible once it is upgraded. The estimated annual benefit stream due to the reduction of the effective O&M costs of air transport services is presented in Table 22. The project annual benefit stream was estimated based on the effective O&M cost saving of P0.35 per passenger-km and the projected number of passengers and the average distance of air transport service. Since F-50 are normally used for relatively short distances, the projected total effective O&M cost savings for air transport services to Cebu were used in the accounting project benefits in the analysis.

5.2.3. Local Transport Costs Savings

It is projected that a significant number of passengers and kilograms of freight for the project influence area (particularly General Santos City) would no longer use Davao City Airport for flights to Manila. With Buayan Airport fully upgraded, this would mean savings on transport for both passengers and freight. Thus, project benefits arising from savings in local transport costs for passengers

Table 21. Estimated added annual operating revenue
of Buayan Airport .

Year	Concession's Rentals *	Passengers' Terminal/Security: Fees **	Total
1991	-	-	-
1992	-	-	-
1993	-	-	-
1994	-	-	-
1995	-	-	-
1996	250,872	652,553	903,425
1997	250,872	686,681	937,553
1998	250,872	722,595	973,467
1999	250,872	760,386	1,011,258
2000	250,872	800,155	1,051,027
2001	250,872	842,003	1,092,875
2002	250,872	886,039	1,136,911
2003	250,872	932,379	1,183,251
2004	250,872	981,143	1,232,015
2005	250,872	1,032,456	1,283,328
2006	250,872	1,032,456	1,283,328
2007	250,872	1,032,456	1,283,328
2008	250,872	1,032,456	1,283,328
2009	250,872	1,032,456	1,283,328
2010	250,872	1,032,456	1,283,328
2011	250,872	1,032,456	1,283,328
2012	250,872	1,032,456	1,283,328
2013	250,872	1,032,456	1,283,328
2014	250,872	1,032,456	1,283,328
2015	250,872	1,032,456	1,283,328
2016	250,872	1,032,456	1,283,328
2017	250,872	1,032,456	1,283,328
2018	250,872	1,032,456	1,283,328
2019	250,872	1,032,456	1,283,328
2020	250,872	1,032,456	1,283,328
2021	250,872	1,032,456	1,283,328
2022	250,872	1,032,456	1,283,328
2023	250,872	1,032,456	1,283,328
2024	250,872	1,032,456	1,283,328
2025	250,872	1,032,456	1,283,328

* Based on the estimated average monthly concession rental collection of ₱20,906.00 of a comparable semi-international airport (Davao City Airport).

** Estimated based on the projected increase in number of outgoing passengers (Table 10.) and adjusted rate of airport terminal/security fee of ₱7.00 per passenger.

Table 22. Estimated potential savings in O & M cost of commercial aircrafts due to Buayan Airport Upgrading.

Year	Savings for Total Passengers/Km.		D E S T I N A T I O N					
			C E B U			M A N I L A		
	Incoming (Pesos)	Outgoing (Pesos)	Incoming (Pesos)	Outgoing (Pesos)	Total	Incoming (Pesos)	Outgoing (Pesos)	Total
1991	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-
1994	-	-	-	-	-	-	-	-
1995	-	-	-	-	-	-	-	-
1996	54,971	56,633	26,386,313	27,183,641	53,569,954	57,830,002	59,577,480	117,407,482
1997	60,100	61,853	28,847,938	29,689,601	58,537,539	63,225,065	65,069,709	128,294,774
1998	65,817	67,678	31,592,274	32,485,358	64,077,631	69,239,733	71,197,075	140,436,809
1999	72,201	74,186	34,656,528	35,609,306	70,265,834	75,955,558	78,043,729	153,999,287
2000	79,340	81,469	38,083,153	39,105,252	77,188,405	83,465,577	85,705,677	169,171,254
2001	87,335	89,632	41,920,600	43,023,192	84,943,792	91,875,982	94,292,495	186,168,477
2002	96,300	98,792	46,224,196	47,420,208	93,644,404	101,308,029	103,929,290	205,237,319
2003	106,369	109,086	51,057,139	52,361,495	103,418,635	111,900,230	114,758,944	226,659,175
2004	117,691	120,670	56,491,649	57,921,533	114,413,182	123,810,863	126,944,693	250,755,556
2005	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2006	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2007	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2008	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2009	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2010	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2011	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2012	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2013	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2014	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2015	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2016	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2017	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2018	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2019	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2020	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2021	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2022	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2023	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2024	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929
2025	130,438	133,720	62,610,276	64,185,433	126,795,709	137,220,856	140,673,074	277,893,929

Notes: Cebu and Manila airports are 480 and 1,052 air kilometers away from Buayan Airport, respectively.

Commercial aircraft O & M savings from replacing F-50 with jet planes (B-737 or A-300) is about P0.35 per passenger-km (see Table 10).

and freight were estimated based on the present costs of transport and the total volume of traffic (passengers and freight) from the project influence area that would no longer use the Davao City Airport.

5.2.4. Net Value Added of the Increase in Production of Perishable Products

As indicated earlier, the Buayan Airport upgrading project will also provide a beneficial impact on the agricultural sector. With a more efficient and cheaper express transport system, it is expected that production of perishable export products, such as fish, fruits and vegetables would increase.

The projected annual benefit streams due to the potential increases in production of perishable products are presented in Table 24. These annual benefit streams were simulated based on the NVA of the expected increases in production of perishable products in the project area as a result of a more efficient and cheaper transport system. Only fish, fruits (citrus and mango) and vegetables were accounted for in this analysis of benefits to the area's agricultural sector. This does not mean that the Airport project's impacts are only limited to these products. It is expected that the project will influence the production of other agricultural and/or horticultural crops, such as cutflowers, that are of high export potential.

The upgrading of the airport is also expected to support abattoire development in the project area inasmuch as surplus carcasses of slaughtered hogs and large animals can be air transported directly to Metro Manila. The development of abbatoir and express transport system is expected to ultimately influence livestock production in the project area. Although the project airport will indirectly influence livestock production, the project benefits from this source was not accounted in this present study not only because of limited data but also due to the fact that such benefits could only be realized if abbatoire is also developed as part of the over-all development initiatives in the area.

Table 23. Projected transport cost savings for General Santos City air traffic due to Buayan Airport Upgrading.

Year	Passengers ^{a/}			Freight		
	Incoming (Pesos)	Outgoing (Pesos)	Total	Fish ^{b/}	Gen.Cargo ^{c/}	Total
1991	-	-	-	-	-	-
1992	-	-	-	-	-	-
1993	-	-	-	-	-	-
1994	-	-	-	-	-	-
1995	-	-	-	-	-	-
1996	5,315,587	5,290,338	10,605,926	38,763,000	14,078,341	52,841,341
1997	5,615,386	5,567,023	11,182,409	41,088,780	14,923,041	56,011,821
1998	5,932,094	5,858,178	11,790,272	43,554,107	15,818,424	59,372,531
1999	6,266,664	6,164,561	12,431,225	46,167,353	16,767,529	62,934,882
2000	6,620,104	6,486,967	13,107,072	48,937,394	17,773,581	66,710,975
2001	6,993,478	6,826,236	13,819,714	51,873,638	18,839,996	70,713,634
2002	7,387,910	7,183,248	14,571,158	54,986,056	19,970,396	74,956,452
2003	7,804,588	7,558,932	15,363,520	58,285,220	21,168,619	79,453,839
2004	8,244,767	7,954,264	16,199,031	61,782,333	22,438,737	84,221,069
2005	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2006	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2007	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2008	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2009	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2010	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2011	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2012	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2013	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2014	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2015	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2016	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2017	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2018	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2019	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2020	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2021	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2022	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2023	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2024	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334
2025	8,709,772	8,370,272	17,080,044	65,489,273	23,785,061	89,274,334

Total Present

Value

at 15% 22,854,089 22,280,833 45,134,922 169,720,071 • 61,640,663 231,360,735

^{a/} Estimated based on the average economic cost (fare) of ₱56.75 per passenger and the total projected passengers as shown in Table 10.

^{b/} Based on 50% of total fishery export (or about 30 mt/day) with an annual increase of 6% and an average transport cost of ₱3.54/kg. (Table 13).

^{c/} Based on the General Santos City freight transported through Davao Airport (Table 9) estimated at ₱3.00/kg.

Table 24. Projected annual net value added in increased
production of perishable products in the Airport
Project Influence Area.

Year	Fishery	Fruits	Vegetables	Total
1991	-	-	-	-
1992	-	-	-	-
1993	-	-	-	-
1994	-	-	-	-
1995	-	-	-	-
1996	4,290,000	2,275,360	4,582,667	11,148,027
1997	4,290,000	2,298,114	4,628,494	11,216,607
1998	4,290,000	2,321,095	4,674,779	11,285,873
1999	4,290,000	2,344,306	4,721,526	11,355,832
2000	4,290,000	2,367,749	4,768,742	11,426,490
2001	4,290,000	2,391,426	4,816,429	11,497,855
2002	4,290,000	2,415,340	4,864,593	11,569,934
2003	4,290,000	2,439,494	4,913,239	11,642,733
2004	4,290,000	2,463,889	4,962,372	11,716,261
2005	4,290,000	2,488,528	5,011,995	11,790,523
2006	4,290,000	2,488,528	5,011,995	11,790,523
2007	4,290,000	2,488,528	5,011,995	11,790,523
2008	4,290,000	2,488,528	5,011,995	11,790,523
2009	4,290,000	2,488,528	5,011,995	11,790,523
2010	4,290,000	2,488,528	5,011,995	11,790,523
2011	4,290,000	2,488,528	5,011,995	11,790,523
2012	4,290,000	2,488,528	5,011,995	11,790,523
2013	4,290,000	2,488,528	5,011,995	11,790,523
2014	4,290,000	2,488,528	5,011,995	11,790,523
2015	4,290,000	2,488,528	5,011,995	11,790,523
2016	4,290,000	2,488,528	5,011,995	11,790,523
2017	4,290,000	2,488,528	5,011,995	11,790,523
2018	4,290,000	2,488,528	5,011,995	11,790,523
2019	4,290,000	2,488,528	5,011,995	11,790,523
2020	4,290,000	2,488,528	5,011,995	11,790,523
2021	4,290,000	2,488,528	5,011,995	11,790,523
2022	4,290,000	2,488,528	5,011,995	11,790,523
2023	4,290,000	2,488,528	5,011,995	11,790,523
2024	4,290,000	2,488,528	5,011,995	11,790,523
2025	4,290,000	2,488,528	5,011,995	11,790,523
Present Value				
at 15%	14,004,500	7,788,350	15,686,052	37,478,903

5.3. Indicative Economic Internal Rate of Return

A comparison of total costs and benefits over a 35 year accounting period for the Buayan Airport upgrading project is presented Table 25. The estimated total present value at 15 percent discount factor of the project costs and project benefits amounted to P346.72M and P604.57M, respectively. The project benefit-cost (B/C) ratio is about 1.74, with a total net present value (NPV) of about P257.85M. A summary of the indicative economic feasibility parameters for the proposed airport upgrading project is presented in Table 26. The preliminary analysis show that the potential reduction in the effective O&M costs of transport services would account a major benefit item due to the project. The project influence area is expected to be benefited in terms of the potential reduction of transport costs and the potential increase in production of perishable high value export products.

The above estimate of the total NPV of the project has been limited to the evaluation of project benefits that could directly be quantified. Several other benefits, such as the NVA of the potential increase of economic activities of the tourism industry (and its related industries) and commerce in the project area which are also expected to be substantial has not been accounted for in the analysis.

In spite of the partial accounting of the potential project benefits, it is estimated that the capital investment for upgrading the Airport would generate at least a minimum economic internal rate of return of 22.0 percent. The expected internal rate of return to the project would be much higher if other potential project benefits could be accounted for.

The sensitivity analysis of the possible changes of costs and benefits was undertaken to determine the economic viability of the project. Results of the analysis are summarized in Table 27. It is interesting to note that even though the project costs would increase by as much as 20 percent along with a reduction in projected benefits by as high as 20 percentd, the proposed project is still economically viable with a B/C Ratio of 1.16, IRR of 17 percent and a total NPV of P67.59M. This sensitivity analysis only includes the project benefits that were reported in this study. Thus, if the other project benefits are fully accounted in the analysis, much more that the economic viability of the proposed project will not be questioned.

Table 25. Projected annual benefit streams, B/C ratio and internal rate of return for the Buayan Airport Upgrading/Improvement Project.

Year	Project Cost (Capital & O & M Costs)	Project Benefit Stream	Net Benefit Stream
(In Million Pesos)			
1991	97.90	—	-97.90
1992	97.90	—	-97.90
1993	97.90	—	-97.90
1994	97.90	—	-97.90
1995	97.90	—	-97.90
1996	5.68	129.07	123.39
1997	5.68	137.89	132.21
1998	5.68	147.50	141.82
1999	5.68	158.00	152.32
2000	5.68	169.48	163.80
2001	5.68	182.07	176.39
2002	5.68	195.88	190.20
2003	5.68	211.06	205.38
2004	5.68	227.78	222.10
2005	5.68	246.22	240.54
2006	5.68	246.22	240.54
2007	5.68	246.22	240.54
2008	5.68	246.22	240.54
2009	5.68	246.22	240.54
2010	5.68	246.22	240.54
2011	5.68	246.22	240.54
2012	5.68	246.22	240.54
2013	5.68	246.22	240.54
2014	5.68	246.22	240.54
2015	5.68	246.22	240.54
2016	5.68	246.22	240.54
2017	5.68	246.22	240.54
2018	5.68	246.22	240.54
2019	5.68	246.22	240.54
2020	5.68	246.22	240.54
2021	5.68	246.22	240.54
2022	5.68	246.22	240.54
2023	5.68	246.22	240.54
2024	5.68	246.22	240.54
2025	5.68	246.22	240.54
Total Present Value at 15%	346.72	604.57	257.85
BOR			1.74
IRR			22%

Table 26. Indicative economic feasibility parameters for the proposed General Santos City - Euayan Airport Upgrading Project, August, 1990.

Particular	Total Present Value* (In Million Pesos)
Project Costs:	
Capital Investment	328.18
Added O & M Costs	18.54
Total Costs	346.72
Project Benefits:	
Increase Airport Operating Revenue	3.57
O & M Costs Savings of Commercial Airlines	287.02
Savings on Land Transportation Costs:	
Passengers	45.13
Fishery freight	169.72
General cargo	61.64
NVA of Increased Production of Export Production	
- Fishery	14.01
- Fruits	7.79
- Vegetables	15.69
Total Benefits	604.57
Net Benefits	257.85
Benefit-Cost Ratio	
	1.74
Internal Rate of Return	
	22.0%

* Estimate based on a discount factor of 15%.

Table 27. Project economic NPV, B/C Ratio and IRR
Sensitivity Analyses.

Change in Cost (%)	Change in Benefit (%)				
	-20	-10	0	10	20
-20					
NPV	206.28	266.73	327.19	387.65	448.10
BCR	1.74	1.96	2.18	2.40	2.62
IRR	22	24	25	27	28
-10					
NPV	171.61	232.06	292.52	352.97	413.43
BCR	1.55	1.74	1.94	2.13	2.32
IRR	20	22	24	25	26
0					
NPV	136.93	197.39	257.85	318.30	378.76
BCR	1.39	1.57	1.74	1.92	2.09
IRR	19	21	22	23	25
10					
NPV	102.26	162.72	223.17	283.63	344.09
BCR	1.27	1.43	1.59	1.74	1.90
IRR	18	19	21	22	23
20					
NPV	67.59	123.05	188.50	248.96	309.42
BCR	1.16	1.31	1.45	1.60	1.74
IRR	17	18	20	21	22

Note: NPV and BCR based on 15% discount factor.
Discount Period = 35 Years

6.0 Policy Implications

The economic pre-feasibility analysis of the proposed upgrading of Buayan Airport was based primarily on secondary data and primary data gathered through key informants interviews. The analysis assumed that once Buayan Airport will provide a comparable service to Davao City Airport, the air traffic (passenger and freight) to and from Gen. Santos City and surrounding municipalities of South Cotabato will no longer take Davao Airport for air transport services. Thus, the anticipated increase in the number of passenger and volume of freight to be served at the fully upgraded Buayan Airport were projected based on the proportion of the total volume of air traffic at Davao City Airport travelling to and from Gen. Santos City and its surrounding municipalities in South Cotabato Province.

Although the basic data used to project the potential increase of traffic volume at the fully upgraded Buayan Airport has been based on estimate provided by the PAL Regional Executive Director. Thus, the projected volume of air traffic must be validated with the use of a more conclusive survey data. A survey of air traffic (passenger) movements (origin and destination) at the different airports of the Philippines, including Buayan and Davao City Airports has been recently implemented by the ATO-DOTC. The survey results were not yet available when this report was being prepared. However, it is expected that the ATO-DOTC survey will be completed in next few months and could be used in undertaking the proposed comprehensive technical and economic feasibility study of the Buayan Airport.

This study has been focused to the economic pre-feasibility analysis of one of the four alternative development schemes for Buayan Airport. Development scheme No. 4 which involves the construction of new runway parallel to the existing runway and other improvements to transform the airport with a standard comparable to the Davao City Airport has been analyzed in this study. Although this development scheme has been highly recommended by USAID consultant and has been assessed in this study to be economically feasible, it is still necessary that this scheme must be compared with the other alternative development schemes. A comparative analysis of the technical viability, economic worthiness and environmental soundness of the different alternative development schemes must be undertaken to provide a stronger basis for final policy decisions.

Whether which of the development schemes is implemented to upgrade the Buaya Airport, the physical infrastructures, new equipments and air navigation control and communication facilities that will be established will not be efficiently

utilized and maintained unless appropriate manpower and technicians are employed. Thus, the training of the existing operation and management staff must be undertaken and an additional highly qualified personnel must be recruited to increase the limited manpower of the Airport.

In addition to facilitating an efficient air transport service, the fully upgraded Buayan Airport can also function for the promotion of the economic opportunities and/or potentials of the project influence area. This function could be performed by allocating part of the passenger terminal for an exhibit space for local products, tourism and other information such that potential foreign and local investors would be informed of the potential economic opportunities in the area.

Furthermore, office spaces for agencies directly and/or indirectly concerned with exports/trade of products and visitors (such as DTI, DA, DOT, etc.) may be provided at the airport. This would further facilitate the efficiency of the air transport system in the area and consequently can help improve local economy.

ANNEXES

Annex A

A Review of the Buayan Airport Upgrading Project Proposal (Based on Engr. Lazaro's Report)

I. This airport is being used at present by Fokker 50 aircraft. With the heavy air cargo anticipated from the proposed Agro-industrial Processing Center, the thickness of the concrete runways becomes critical, aside from the needs to provide for cargo terminals and facilities.

II. Proposed for development are:

	Total Cost (x 1,000)	Duration (months)
1. Extension of the runway 145 meters to the south and 120 meters to the north.	P 4,300	12
2. Removal of obstructions in the approach to Run- way.	200	3
3. Relocation and expansion of an apron and taxiway (16,000 sq.m.)	15,600	18
4. Construction of about 750m. of new access roads	2,000	18
5. Construction of FSS Control Tower Building (4m x 4m x 6 storeys)	2,000	18
6. Relocation of new passenger terminal building (17m x 42m = 714 sq.m)	7,000	18
7. Construction of new cargo terminal building (1,500 sq.m)	11,000	18
8. Construction of peri- meter fence (4,900 m)	2,500	6
9. Construction of FSS/ Control Tower	500	12
10. Procurement and installation of air navigation equipment and instruments (ADC/APP)	1,100	12

11. Construction of airfield lighting system.	15,600	12
12. Construction of new fire station with qtrs. (10m x 16m)	1,300	12
13. Fire-fighting equipment (1 Firetruck)	7,800	-
14. Yardwork/landscaping of the terminal area.	2,200	6
15. Dredging and Reclamation works (288,000 cu.m.) (working 12 hrs/day)	54,000	24
16. Building for VOR and DME (40 sq.m)	400	16
17. Visual approach slope indicator (VASI)	1,700	6
18. Construction of Vehicle Parking Area (VPA)	3,500	6
19. Putting of Concrete overlay on the existing asphalt runway (1330 m x 30 m x 0.27 m)	96,000	9
	----- 228,700	
Mobilization: 2% of 228,700	4,600	
	----- 233,300	
3% preliminary design 6% detailed A & E, and 6% supervision, or 15% of 233,300	35,000	
	----- P268,300 (\$12.2M)	

III. DISCUSSIONS:

1. The recently bidden-out construction work are the extension of the runway and the stopways at both north and south runway approaches. The winning bidder was Sarangani Rockfill, Inc., with a bid of P4,270,000 to be completed within 150 calendar days.
2. The inevitable further development of this airport would need equipment and infrastructure estimated at P268.3M or \$12.2M. However, there appears to be some problems that have not been given attention or study by ATO

- a. The present runway, about 1,330 meters long and 30 meters wide is asphalt 4" thick,. Which cannot accommodate BAC 1-11, but can only handle Fokker 50, HS 748 and smaller aircraft;
- b. The present newly built passenger terminal building according to the airport manager, is built too close to the runway, i.e., not far enough to satisfy ATO standards. It is therefore contemplated that the terminal may have to be torn down and relocated a little further away - an expensive correction;
- c. It was also reported by DOTC and ATO that the winning bidder must use concrete pavement with a thickness of 27 cms (11 inches), for the runway extensions, and not the 4" asphalt pavement as per enclosed plans. This as a rather odd decision given the existing 4" asphalt pavement, unless it is expected that in the future the entire existing 1330 m x 30 m runway will be replaced by concrete 27 cms thick. The objective seem to be to accommodate bigger passenger planes and heavier cargo planes -which a 4" asphalt runway seems inadequate for;
- d. Replacing the entire existing runway with a concrete payement will take one year or more. Can Gen. Santos City afford to have no airport for one year? The closest airfield to Gen. Santos City is at Allah Valley, about 70 kms away, which is smaller than the present Gen. Santos City airstrip and good only for Sunrisers or smaller aircraft and not for Fokker 50;
- e. An alternate scheme to address the need for an airport during the re-construction of the existing runway at Buayan was proposed by the Mayor of Gen. Santos City, who is offering a location for a completely new airport, at Brgy. Apopong, near the Espina property, about six km west of the city proper. The runway would require a bridge crossing across the Saboay River. The Mayor has been authorized by the city council to purchase the site. Development of the site can be considered along one of two lines:
 - (i) As a temporary airport about 1,330 m. long x 30 m wide with asphalt pavement, to be abandoned after the Buayan Airport is completed. This temporary airstrip, however, could continue to be used for General Aviation. The Gen. Santos City area is already in need of extensive dusting/spraying plus small private planes coming from the Koronadal Valley. A ballpark estimate of this task would be:

Clearing 1,600m x 200m	-	P 4.4	M
Base course 1,300m x 30m x 0.40m	-	12.2	
Asphalt 1,300m x 30m x 0.10m	-	15.0	
Runway bridge across Saboay River	-	20.0	
Access roads, 3 kms	-	7.8	
Temporary terminal 500 sq.m.	-	3.7	
Finishing 1,600m x 200m	-	3.8	
Real estate 1,600m x 200m	-	37.5	

		104.4	
Mobilization: 2% of 104.4M	-	2.1	

		106.5	M
3% Preliminary design,			
6% detailed A&E, 6% supervision			
of construction, or 15% of 106.5M	-	16.0	

GRAND TOTAL		P122.5	M

or \$5.6 M (at P22/\$1.)

(ii) This new site can be developed into a new semi-international airport with the same standards as those of Davao City or Zamboanga City, a ball-park estimate of about P800 M, or \$37 M (at P22/\$1.).

f. Another alternative would involve an even larger upgrading of Buayan Airport:

- (1) A new runway, capable of handling B-747 and Airbus planes, to be built parallel to the existing runway. The runway would be about 40m x 2,500m, with the same standards as the semi-international airport in Davao City (36 m x 2,500 m) with 20,000 sq m apron as in Zamboanga City (45 m x 2,610 m) with 30,000 sq.m. apron. Both have VASI;
- (2) The existing runway shall continue to be used while the new one is being constructed. Later, this existing runway can be used as taxiway with north and south connections, and can also serve for emergency purposes.
- (3) The existing new passenger terminal need not be relocated;
- (4) There would then be sufficient space for a cargo terminal building, about double the floor area of the passenger terminal building.
- (5) The east perimeter fence would have to be relocated at least 280 meters to the east, perhaps necessitating the relocation of gravel road

presently running a few meters from the east perimeter fence;

- (6) Additional real estate (about 35 hectares) will have to be purchased from private owners. This however, is expected to be somewhat reasonably priced considering that the area is sandwiched between the present airstrip and the Buayan River. This river is about 400 meters away from the perimeter fence;
- (7) No difficulties are expected. The length of the new runway 2,500 meters is possible by reclaiming a gross area of 600 m x 120 m from Sarangani Bay. This area of the Bay is fairly shallow;
- (8) The coral reef along the shoreline at a distance of about 300 meters is dry during low tide, which means a fill of only about four meters to reclaim the 120m x 600m area or a volume of 288,000 cu.m.

- (9) The estimated cost of this new air strip is:

			Months
C-20	Real Estate, 34 Kas	- P39.8 M	6
C-21	Clearing (76 Has)	- 8.9 M	6
C-22	Reclamation (128.000 cu.m.)	- 54.0 M	30
C-23	New cargo terminal building (1,500 sq.m.)	- 11.0 M	18
C-24	Base courses and concrete pavement (2,500 m x 40 m x 0.27 m)	- 240.0 M	30
C-25	New perimeter fence, 5,500 m	- 2.8 M	6

		363.6 M	
Mobilization: 2% of 356.5		- 7.1 M	

		363.6 M	
3% Preliminary design, 6% A&E, 6% supervision of construc- tion or 15% of 363.6		- 54.6 M	

Grand total		- P418.2 M	
or \$19.0 M at P22/\$1.			

Annex B

Theoretical Model for the Assessment of Project Impacts

The basic model for illustrating the potential impact of an airport development or major improvement project on producers and consumers of highly perishable products is presented in Figure 1. The model adheres to classical supply and demand analysis for consumer products in a given market place. Figure 1 presents the possible changes in demand and supply of perishable products as brought about by the development or major improvement of an airport that would facilitate express transport services.

Such upgrading of an airport in an area producing perishable products would increase the number of traders and/or the volume of traded perishable products. Such an increase in the number of traders and/or product volume is influenced by the reduction of transaction costs due to the reduction of local travel costs (including spoil age). In other words, such project would affect the demand for perishable products in the production area, as illustrated by the shift in the demand curve from D_0D_0 to D_1D_1 (Figure 1). This increased demand would increase prices of the products in the area from P_0 to P_1 . Such an increase in the product price would benefit producers through increases in income.

The increase in perishable product prices will consequently influence producers to expand their production through the adoption of new technologies or other means in order to increase supplies. The potential increase in the supply of perishable products (as represented by the shift in supply curve S_0S_0 to S_1S_1) is expected to be less substantial, and thus the equilibrium price level will only be P_2 . This inelastic response of perishable product supply with respect to increase in price can be explained by the nature of the industry. Using fish as an example of a major air-transported perishable product: Commercial and municipal fisheries are generally dependent upon local environmental conditions such as climatic/weather condition, and the status of the fishing grounds (resources) and therefore, control of much of fish production is generally beyond the fishermen's capacity.

In summary, an airport upgrading project will stimulate changes in the demand and supply of perishable products in the project's influence area. Such changes will give an equilibrium product price level of P_2 which is still higher than the price (P_0) before the airport is upgraded. The higher equilibrium product price would obviously benefit the producers in the influence area.

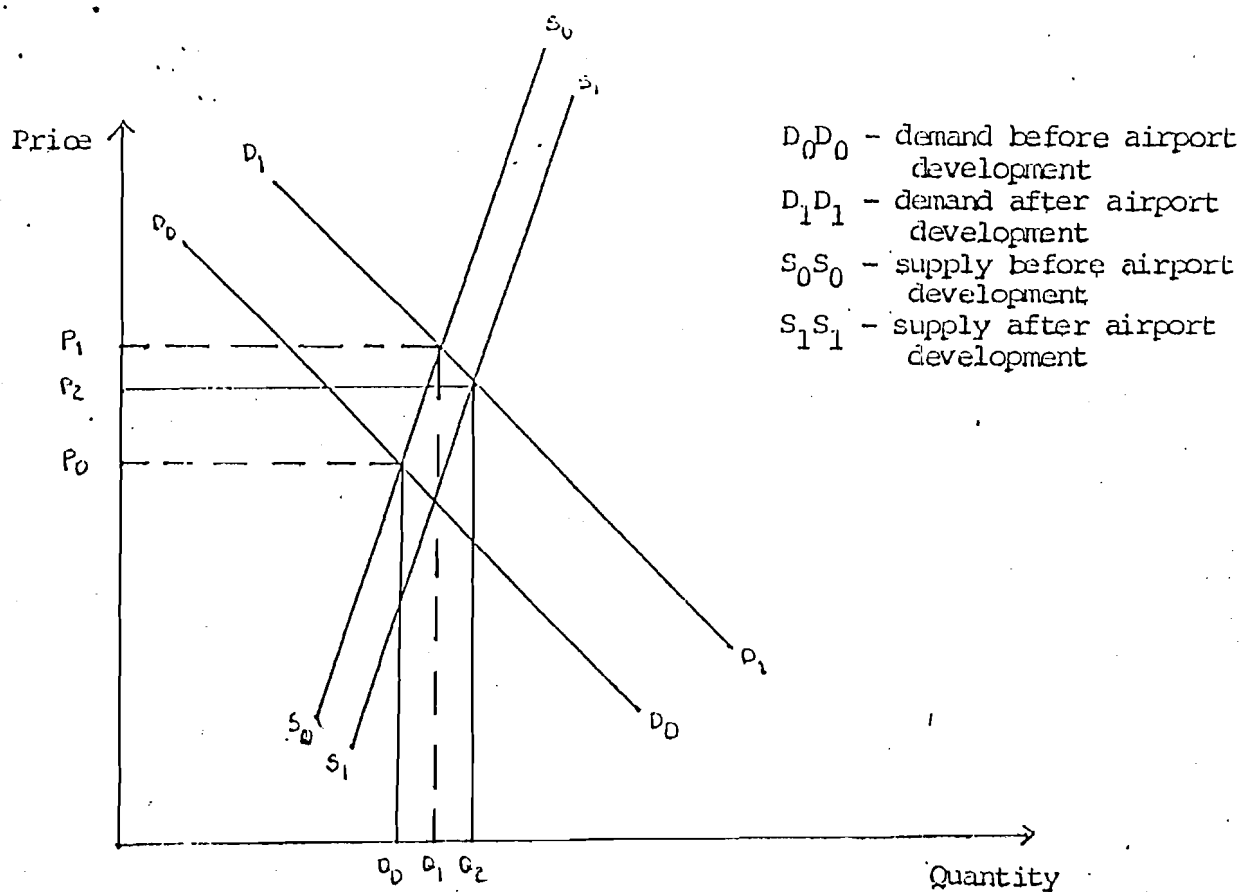


Figure A-1. Theoretical supply and demand curves for perishable products (e.g. fresh fish; fruits)

A more practical model for illustrating the potential impact of airport upgrading on the fishery industry is presented in Figure 2. The model assumes that consumers differentiate the value of fish according to its quality or freshness. The value or price of a given fish species is directly related to its quality at the consumers market.

Fish and other marine products are generally perishable. In the absence of cold storage facilities, the quality of fish deteriorates easily and rapidly, through the effects of bacteria and other microorganisms. Theoretically, the quality of transported unprocessed fish quality over time is based on the exponential growth rates of bacteria and other microorganisms that affect unprocessed fish.

Upgrading a nearby airport will not only result in a significant reduction in local transport cost of the produce (from their origin to airport) but also will tend to reduce the travel time to their final market destination. Based on the model (Figure 2), the travel time to a given market destination (e.g. between producing area and within the project influence area to the consumers' market) before and after the upgrading of the airport is represented by Ot_1 and Ot_2 , respectively. The difference between Ot_1 and Ot_2 represents the amount of travel time saved for transporting perishable air freight to the ultimate market place.

Travel time is very critical in marketing perishable products such as unprocessed fish. Hence, the more time required for transporting unprocessed would mean that the quality of fish would become lower and thus, would command a lower market price. Based on the theoretical model, the expected fishery benefit from an airport upgrading project can be estimated in terms of the price difference of the transported fish at the consumers market. A significant reduction in travel time from Ot_1 to Ot_2 would mean that the quality of fish at the consumers market is much better. Thus, the market price received by traders in those perishable products which are transported via the project airport would be visibly higher than before, and consequently, the traders should generate greater profit margins.

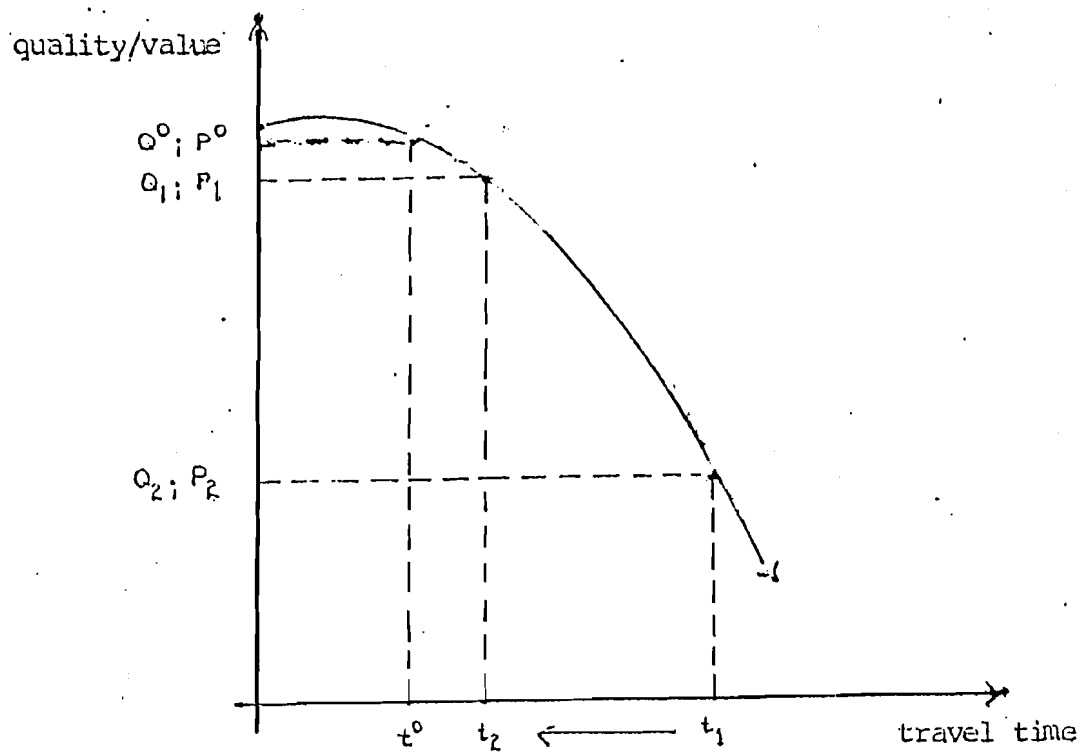


Figure A-2. Theoretical relationships of quality/freshness (price/value) and travel time in the marketing (exportation) of highly perishable products (e.g. fresh fish)